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REVOLUTIONARY FINANCE? CAPITAL MOBILIZATION AND UTILIZATION IN PRE-WAR GERMANY AND ITALY

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Abstract

Accumulation, mobilization, and efficient utilization of capital represent serious obstacles to industrialization. Financial institutions may ease these problems by stimulating savings, matching savers and investors, and offering business or investment advice to entrepreneurs. German-style universal banks are believed by many to have played a crucial part in overcoming all three capital-related stumbling blocks. Using evidence on deposit taking and branching, banks' liability structure, interlocking directorates between banks and industrial companies, and firm-level investment patterns, the paper investigates the role of German and Italian universal banks in the mobilization and efficient utilization of capital at the turn of the last century.

Revolutionary Finance? Capital Mobilization and Utilization in Pre-War Germany and Italy

Developing economies often experience difficulty in financing the move from small-scale, craft and agrarian systems to modern, technologically-advanced industry. Such obstacles, as is well articulated by Rondo Cameron, include the lack of accumulation, mobilization, and efficient utilization of capital.[1] Financial institutions, such as banks, may ease these problems by stimulating savings, matching savers and investors, and offering business or investment advice to entrepreneurs. Alexander Gerschenkron (1962) was by no means alone in believing that the German style of finance, as represented by the large, joint-stock, universal banks, played a crucial part in overcoming all three capital-related stumbling blocks on the road to industrialization.[2]

Universal banks combine short-term commercial services, long-term investment banking, and brokerage activities, and are also thought to have maintained close, long-term relationships with industrial firms. Because of this involvement with industry, German banks are thought to promote stronger and more efficient industrial investment than their Anglo-American counterparts. Indeed, the close involvement of banks in the planning and implementation of investment decisions is seen as a catalyst for the high rates of capital formation that fueled the second wave of German industrialization between unification (1871) and World War I (1914).

Italian industry also grew rapidly after political unification (1861) and during the Giolitti Era (1896-1913) in particular.[3] In the mid-1890s, a consortium of large, German banks established two joint-stock banks in Italy and fashioned them after the German model. These two were the largest and most important credit banks, though there were several other joint-stock credit banks in operation at the time. Gerschenkron attributed great importance to the rise of German-style universal banking in Italy: "It is possible to surmise that the upsurge of 1896-1908 was largely rendered possible by the importation of the great economic innovation of German banking in its most developed and mature form."[4] The use of the term German banks' may exaggerate the true influence and control of German bankers even over the two banks they helped found. Both Confalonieri (1974, 1982) and Hertner (1985) have shown that the founding consortium for BCI never intended a protracted engagement in Italy, but rather planned to relinquish ownership quickly.[5]

This paper investigates the role of German and Italian universal banks in the mobilization and efficient utilization of capital at the turn of the last century. To understand mobilization, the paper focuses on quantifying the deposit taking and branching business, the liability structure of universal banks, and the extent of interlocking directorates between banks and industrial firms. The extent of deposit taking and branching bears directly on the universal banks' ability or interest in mobilizing idle capital. Measuring interlocking directorates, the joint membership by the same individual on multiple supervisory or executive boards, provides insight into the distribution of financing networks throughout the economy. Interlocking directorates also may have offered banks a means of oversight and control of firms they financed, and evidence on pervasiveness therefore may illuminate the role of the universal banks in ensuring the efficient utilization of capital. More direct evidence on utilization arises from the final piece of evidence in this paper: a comparison of the investment patterns of bank-affiliated and independent firms.

Historiographical questions about the role of the universal banks in the German industrialization relate closely to the more general debate in economics over the role of financial institutions in economic growth and development. The literature comprises two lines of inquiry: first, whether expansion of the financial system promotes economic growth or vice versa; and second, whether certain types of financial institutions perform the tasks of intermediation more efficiently than others.[6] This paper concentrates on the latter of these two questions, with the view that understanding the impact of financial institutions on economic growth hinges on a clearer grasp of microeconomic interactions.

The Deposit Business of Universal Banks

Questions concerning capital mobilization assume that sufficient capital exists from either domestic or foreign sources. At least since the beginning of this century, historians have debated whether or not capital was deficient in Germany during industrialization. The question now seems to have been answered, if only for the first half of the nineteenth century, and Borchardt's (1963) view, that the existence of capital shortages had always been exaggerated seems to have gained general acceptance. Indeed, Brockhage (1910) mounted a early challenge to the notion of capital

shortage in Prussia, claiming that, "the condition of Prussian economic life in the twenty-five years after the second treaty of Paris was such that there was continuously more capital available than was put to productive economic use."[7] Presumably, capital would have continued to accumulate throughout the nineteenth century and would have constrained industry less and less as the century wore on.

The findings on accumulation in turn raise the question of the use of capital. While banks may be important for capital accumulation, they are fundamentally concerned with mobilization, and questions about the banks' involvement in matching savers and entrepreneurs persist. The suggestion that finance was lacking in industrial firms around the mid-nineteenth century, has prompted some to assert that there was a failure to direct the country's savings toward enterprise. Whale (1930), for example, interpreted the concomitant abundance of savings and lack of industrial investment to mean that "those who had the necessary funds were for the most part neither willing nor fitted to become progressive entrepreneurs themselves, nor would they trust their money with others who had the required qualities."[8]

The extent of the universal banks' deposit business sheds some light on the significance of these banks in mobilizing economy-wide capital for use in industrial development. If capital was abundant but inefficiently allocated at mid-century, then there should have been an important role for the new credit banks to play in channeling available funds into industrial undertakings via their deposit business. The data on the development of a deposit business by credit banks undermine such an hypothesis.

The debit operations of the banks developed slowly in the beginning--with virtually no deposits being accepted at the outset (in the 1850's). Eventually, deposits were taken for short terms--three, six, or twelve months--and at low interest rates (averaging between one and two percent until 1906).[9] The Deutsche Bank was the first to foster the deposit business; opening its first deposit office in 1871. Growth in this direction remained meager until 1894 but increased rapidly thereafter.[10] This pattern is born out both by the number of deposit offices founded and by the levels of deposits accepted by universal banks. Data to this effect are reported in Tables I and II.

Table I here: Deposit Offices of Berlin Banks

The spread of universal banks' depository offices offers clues to the extent of banks' mobilization efforts, because branches aid the direct collection of deposits from small savers. Branching across regions also facilitates banks' matching of surpluses in some regions with deficits in others. Furthermore, inter-regional expansion permits banks to diversify their short-term liabilities and possibly safeguard against systemic instability.

Table I shows that the number of offices for all of the Berlin banks totaled a mere ten in 1885 and had grown to only 22 nine years later. By 1894 the great banks had opened 73 deposit offices, but stronger growth came in the eight years leading up to World War I. By 1913, there were still only 252 great bank branches (22 of which were foreign), yet this number represented a near tripling of the level a decade earlier.

Since some share of these branches represented the conversion of pre-existing banks into branches of the great banks, the net gain in the system as a whole lies somewhere below 230. Furthermore, the new offices of the great banks were clumped in certain regions of the country. Almost all of Schaaffhausen's branches (20 of 22) and nearly half of Deutsche Bank's domestic branches (26 of 54), for example, were located in the heavily industrial Rhine Province. At the same time, four of the Berlin banks maintained no offices in the southern provinces, and one had only a single branch (in Alsace-Lorraine).[11]

The second part of Table I gives the number of deposit offices of each of the great banks in 1913. Given the initiative shown by the Deutsche Bank in the 1870's, it comes as no surprise that that bank held the lead in branch formation. At 47 and 44 deposit offices respectively, the two other great banks that remain in business today, Dresdner and Commerz- und Discontobank, fell close behind the Deutsche's 48 branches. With the exception of the Berliner Handelsgesellschaft (with no deposit offices), the other great banks maintained between 16 and 30 branches in 1913.

Table II here: Deposits held at German and Italian banks

The number of deposit offices may not be a crucial determinant in the growth of deposits to the universal banking system, since it is possible for institutions in other areas to collect funds regionally and make deposits with the universal banks in their base cities. In this way, associated

banks in outlying regions might function as branches to the universal banks. Thus, growth of deposits in the universal banking system is the only direct measure of the banks' success in capital mobilization. Table II gives deposits in levels and as a share of banks' liabilities as well as the number of banks included in each category. The data are given separately for the German great banks and provincial banks and the large Italian universal banks and are shown together in Figure 1.

Deposits might be made on term or demand, and it is difficult to disaggregate the two types for certain. The figures given in Table II sum deposits and credits to current accounts and likely combine demand and time deposits. As Table II indicates, deposits and credits in the German universal banks remained below 50 percent of bank liabilities until after the turn of the century and only reached 75 percent during the first world war. The four large Italian universal banks, by contrast, had already hit 70 percent by 1903and 91 percent by 1917. As Figure 1 illustrates, all three categories of banks converged to similar deposit to liability ratios with the onset of World War I. The figure also underscores the virtually identical paths of deposit ratios of the great banks and provincial banks throughout the period.

The resulting figures provide an upper bound on the extent of capital mobilization, because, along with funds provided from individuals' surpluses, the measure includes deposits created by the banks through their lending activities. Deposits alone may therefore provide a more accurate picture of banks' contribution to mobilization. Current account credits ranged from four to five times deposits, and therefore deposits comprised less than ten percent of German bank liabilities, in the period before 1900. Credits fell to twice deposits in the five years following 1907and to nearly equal levels after 1911. The expansion of both types of liabilities, in addition to the gradual shift from current account credits to deposits, meant that deposits alone nearly quadrupled as a share of liabilities between 1900 (ten percent) and 1919 (38 percent). Despite this burgeoning in the deposit business, Riesser (1911) concluded that the level remained lower than that in Great Britain, France, and the United States.[12]

Relative to liabilities, deposits in German universal banks also fell below those in the Italian banks in the first years of the twentieth century. Italian deposit ratios failed to keep pace with those in Germany, and by World War I, the German banks' ratio (29.3 percent) surpassed that of the Italians (23 percent).

A second way to estimate deposit mobilization (as opposed to deposit creation), is to subtract loans and credits (debits on current accounts) from deposits and credits on current account. Since the numbers are aggregated, the results apply to the universal banking system as a whole. Thus, internal drain--the transfer of loaned funds of one bank to deposits in another--causes no problems of interpretation in this context. Aggregation, however, restricts to averages conclusions about how banks covered their assets. The numbers provide a striking result in the German case; namely, that loans and credits exceeded deposits and current account surpluses for the entire period through 1914. After 1914, the balance reversed, and the deposit surplus reached 25 billion Marks by 1919 (equivalent to 45 percent of banks' liabilities).

Clearly, for the German banks, the strongest growth in deposit ratios arrived on the heals of the economic expansion that began around 1894 and mushroomed during World War I. Together, the data seem to indicate a lack of effort on the part of the credit banks in fostering deposits for use in industrial enterprise in the nineteenth century, but there is an alternative view. Borchardt (1963), for example, argues that the banks did not take deposits in their early years because of lack of demand for new funds from industry. This explanation, however, was developed in the context of the first half of the nineteenth century. As I have just indicated, credit banks continued to neglect the deposit business until 1871--and to a great extent until late in the nineteenth century--but pursued it ardently thereafter. If Borchardt's hypothesis--that banks' deposit policy was a response to industry requirements of external finance--may be extended past mid-century, it would thus imply that demand for outside funds should have remained low until the mid-1890's and should have then risen continuously throughout the two decades before World War I.

A study of company balance sheets, however, shows that German firms were becoming more--not less--liquid after the turn of the century. As a share of fixed assets, most German firms had higher stocks of liquid assets after 1900 than before. Table III compares internal liquidity and net profits for three samples of industrial firms in Germany and Italy over the period 1880 to 1912

and also reports estimated average annual growth rates of the two variables. The Italian data are available for a small subset of these years (1903 to 1911). Among long-lived German firms, median stock liquidity as a share of fixed capital rose from approximately 20 percent in 1880 to 60 percent in 1912, yielding an average annual growth rate of two percent.[13]

The internal funds of newly public German firms (IPO firms) grew quite a bit faster (eight percent per year on average) than that of the more established firms, but part of this is due to the fact that the sample composition changes over the period. The IPO firms enter between 1880 and 1900, and the firms arriving in the later years of the sample held higher levels of liquidity than the earlier entering firms. Nonetheless, even counting from 1892, when at least half the sample had already entered, the liquidity ratio of the IPO firms (ten percent) fell significantly below that of the long-lived firms (32 percent). The IPO firms still lagged the long-lived firms in 1900 (36 versus 50 percent) but had caught up shortly thereafter.

Given the possibility of reporting differences, it is difficult to make direct comparisons of internal liquidity for Italian and German firms. The data available suggest that the Italian ratios fell in a similar range as those for German firms during the same period. This means, relative to the firms' ages and the stage of the economy, however, Italian firms held higher ratios of liquidity to fixed assets. Median liquidity for Italian firms remained fairly constant, as is reflected in the insignificant growth rate reported in Table III. Profits for German and Italian firms relative to fixed capital were significantly lower than liquidity, but the growth rates are similar.

The evidence suggests that either firms would have made use of additional capital, but the banks failed to mobilized deposits in the nineteenth century; or firms only needed funds after the economic upswing of the 1890's, at which point they had accumulated high levels of internal funds. In the first scenario, the banks were needed but failed; and in the second, the banks' capital mobilization efforts were superfluous. In light of the evidence, therefore, regardless of the reasons underlying the evolution of the universal banks' deposit business, conjectures that the universal banks spurred industrial investment by linking private savers with productive uses for their capital seem unpersuasive.

Banking and Industrial Networks

Universal banks, particularly those in Germany, are thought to form close relationships with client firms, and many of these ties are apparently formalized via interlocking directorates (appointing the same individual to bank and firm boards).[14] Because joint board memberships are supposed to have eased information problems between the sources and uses of funds, many have pointed to interlocking directorates as a promoter of investment during Germany's industrialization. Furthermore, by placing individuals on multiple firm boards, the banks created networks of industrial firms with varying investment programs and capital requirements. Thus, financial-industrial networks represent another potential means of capital mobilization if the intervention of the banks promoted information flows between enterprises with excess funds and firms in need of finance.

Gerschenkron is perhaps the best-known advocate of the view that the banks provided entrepreneurial advice to firms in their networks, and such consultancy services should have yielded competitive advantages to these affiliated companies. Interlocking directorates, therefore, may have improved the efficiency of capital utilization; encouraging capital to go further in individual undertakings.

While restricting attention to interlocking directorates ignores informal channels of bank-firm interaction and abstracts from the qualitative side of relationship banking, the tactic has the obvious advantage of providing a quantitative measure that can be compared internationally and inter-temporally.[15] Furthermore, formalized relationships constitute a principal identifying characteristic of German-style universal banking and are repeatedly emphasized in the literature.[16]

Universal Banking Networks in Germany

In order for interlocking directorates to have facilitated capital mobilization during industrialization, universal banks would have had to have built their networks early in the development process. At least in Germany and Italy, interlocking directorates could be formed only among joint-stock corporations, since these are the only type of firm required to maintain supervisory and executive boards. This institutional structure implies limits on the ability of banks to mobilize

capital through formal networks.[17] Joint-stock companies, and interlocking directorates among such firms, played a minimal role in the early stages of industrialization in Germany. Joint-stock companies began to form in Germany in the first half of the nineteenth century, but their numbers remained low until the post-unification boom of the early 1870's. Many of those early companies failed, and the number of joint-stock flotations fell to between 50 and 100 for most of the 1870's and the early 1880's.[18] The late eighties and late nineties brought two further booms in company flotations, but the growth was punctuated by severe stock market crises in the early nineties and 1901. Thus, joint-stock firms formed in large numbers during the later phases of industrialization in Germany, and it is difficult to ascertain the causal relationship between industrial growth and the flourishing of share companies.

Recent research has shown that even among German joint-stock companies, interlocking directorates arose on a significant scale only after the first stages of industrialization and--as is demonstrated in the preceding section--after firms had begun to accumulate internal liquidity.[19] Thus, even abstracting from the problem of limited potential, interlocking directorates seem to have played a proscribed role until the very last stages of German industrialization.

The question remains how widely the impact of universal banking networks was felt once interlocking directorates began to form. The historical literature has tended to either take extreme positions on the extent of bank influence or ignore the issue all together.[20] This paper approaches the problem by estimating both the proportion of firms and the percentage of economy-wide share capital involved in formalized banking relationships of various types.

Table IV presents data on the makeup of supervisory and executive boards of a random sample of 400 joint-stock companies in 1905. The data come from the *Handbuch der deutschen Aktiengesellschaften*; a source that reported on every joint-stock company in Germany. The figures are disaggregated into five bank-attachment categories: interlocking directorates with no banks, private banks only, provincial (small) banks only, great banks only, or a combination of provincial and great banks.[21] The variables include the average size of the executive and supervisory boards, the number of banks and non-bank joint-stock firms associated with the firm, the percentage of each board's seats filled by concurrent bank board members, as well as several variables quantifying the direction of representation (firm to bank or bank to firm) and positions held by concurrent

bank-board members. The first columns give the means for the various sub-populations, while the last five columns provide a one-way analysis of variance (ANOVA) and several t-tests on the differences in means.

Table IV here: *Data on Interlocking Directorates in Germany, 1905*

Statistically significant differences arise among the categories of firms for every variable in Table IV. Clearly, firms with combined-bank attachment maintained the largest executive and supervisory boards. Yet such firms were also the largest, and the correlation between firm size--especially when measured by share capital or net worth--and executive and supervisory board size hovers around 43 percent in the sample as a whole. When broken down by bank-attachment status, the firms with no affiliation or only private- or small-bank affiliation show greater correlation between firm size and board size than do companies with great-bank or combined-bank attachment. Thus, there may be a maximum efficient scale for executive and supervisory boards.

Firms affiliated with a combination of banks received the largest number of concurrent bank-board members (from both small and great banks) and maintained the highest percentage of bankers on their supervisory boards. While the high magnitude of representation might be seen as a size effect, the percentage of representation is not obviously related to size. Indeed, the number and percentage of interlocked supervisory board seats correlate positively in the full sample (at 20 percent) but negatively in each of the bank-attachment sub-samples.

Table IV also provides data on the presence of banks' supervisory and executive board members in the various positions on firm boards. Of firms with attachments to a joint-stock bank, 67 percent maintained concurrent bank-board members in the chair or vice-chair position and 78 percent received representation among the regular members of the supervisory board. In contrast, only 11 percent of these firms maintained representation--either to or from a bank--through their executive boards.

The general absence of interlocking directorates via the executive boards of industrial companies is striking. In only four percent of firms with joint-stock-bank representation did a bank director (member of a bank executive board) sit on the firm executive board. While 49 percent of

the bank-attached firms received supervisory board representation from a bank director, only nine percent of these firms sent a director to the supervisory board of a bank. Nonetheless, cases in which bank executive board members sat on a firm's supervisory board without any concurrent bank-firm supervisory board representation comprise only 15 percent of the sample of joint-stock-bank attached firms. The share falls to nine percent when only firms with banker-held chair or vice-chairmanships are considered. Thus, one-sided bank representation appears to have occurred infrequently.

One also cannot ignore the prevalence of interlocking directorates among non-bank firms. Ninety percent of bank-attached firms also received representation from other non-bank firms, and all but one firm with great-bank or combined-bank attachment were involved with other non-bank firms. The large standard deviations given in Table IV indicate the high degree of variation in the number of non-bank firms attached to the firms in the sample. Nonetheless, the difference in means tests show that there is significant variation across bank-attachment categories. The non-bank attachments of firms with both great- and small-bank attachment are particularly impressive: the average number of represented firms was 38, and the 25th, 50th, and 75th percentiles were 11, 24, and 46, respectively. The firm with the most non-bank firm representation had 220 other firms represented on its supervisory and executive boards. Although they did so at a lower rate (25 percent) than bank-attached firms, even firms without bank representation engaged in interlocking directorates with other industrial firms. Among these firms, the number of other non-bank firms represented ranged from one to 36, with a median of two.

Finally, it is important to point out the shares of firms falling into the bank-attachment categories. Approximately 31 percent of joint-stock firms were involved only with small or private banks. While 20 percent of joint-stock firms had formalized relations with a great bank, only two percent of the sample interlocked only with great banks. The small share of firms engaged in interlocking directorates with only a great-bank is particularly notable, since it underscores the near absence of exclusive relations between the great banks and industrial firms.

Nonetheless, while approximately half of joint-stock firms engaged in interlocking directorates with any type of universal bank, approximately 88 percent of the economy's share capital was invested in companies that had interlocking directorates with banks. While 23 percent of firms had bank executive board members on their supervisory boards, these firms accounted for 40 percent

of the economy's share capital. Naturally, the gap in percentages varies by sector. In mining and electro-technicals, for example, 85 to 90 percent of firms had bank affiliations, but 99 percent of the sector's share capital was linked to banks though interlocking directorates. At the same time, 37 percent of mining firms had a bank director on their supervisory boards, but the capital of these firms represented only 31 percent of mining share capital. Furthermore, while less than 12 percent of the population had a great-bank director on its board, these firms accounted for 31 percent of the economy's share capital. Thus, the pervasiveness of bank-firm relationships via interlocking directorates is impressive, not so much because of the numbers of firms affected, but because of the proportion of the economy's share capital involved.

The sectoral concentration of the great banks arises frequently in the literature on industrialization. Some have seen the banks' practices as focusing resources where they would receive the highest returns, yet others have suggested that the universal banks created lopsided growth of the German economy. Despite the contradictory findings on the ultimate effects of the banking system on economic growth and development, the literature has yielded the nearly unanimous observation that the great banks focused their attention on a small number of sectors. There is less of a consensus opinion on the Italian experience, though there is a similar sense that BCI created some distortion in its sectoral concentrations.

Table Va here: *Number and Size of Firms with Great Bank Representation, Germany, 1910.*

Table Va breaks down the shares of joint-stock firms in each sector and for each sector gives the average share capital, the percentage of great bank representatives, and the share capital relative to the economy-wide average all in 1910. According to these estimates, mining, electrical, machinery, and transportation firms were the most likely to have interlocking directorates with the great banks; absorbing 63 percent of all representatives placed by these nine banks. With the exception of machinery firms, the bank-dominated sectors were also the largest and had share capitals ranging between two and five times the average for joint-stock firms. These same sectors,

however, made up only 30 percent of the population of German companies.[22] Table Va does not reveal the additional information that such firms were also highly likely to involve themselves with multiple banks.

On the other end of the spectrum, textile, paper, rubber, wood, stoneware, printing, and food companies made up over half the population of non-commercial joint-stock companies but accounted for less than 17 percent of great bank representatives. The food and beverage sector alone constituted over a quarter of non-commercial share companies but took only six percent of great bank representatives. All of the neglected industries were comprised of relatively small firms: most had share capital in the range of 50 to 70 percent of average capitalization for non-commercial firms. Only textile companies came close to the size of great-bank firms, and at 90 percent of mean share capital, these undertakings fell far below the capitalization of mining, transport, electro-technical, and steel making firms.

The sectoral breakdown supports the traditional notion that the great banks concentrated their efforts in a small number of industries. Far less attention has been paid to the clientele of the smaller universal banks. The provincial banks maintained much the same financial structure as their Berlin counterparts but seem to have served a more diversified portfolio of industrial companies. Recent research demonstrates marked sectoral differences between the network membership of the great banks and the provincial universal banks. Textile and chemical firms, for example, appear to have been more commonly involved with provincial banking networks than with the great-bank networks. Firms in construction and food products (including beer brewing) tended to remain independent of banking affiliations.

Part of the apparent sectoral discrimination is certainly due to size. The largest firms became affiliated with the great banks, and certain industries naturally lend themselves to production on a large scale. Furthermore, regional specialization of industry may have meant that provincial banks provided financial services to the branch of industry in their region, and those banks that served regions with small-scale industry never needed to grow to the scale of the great banks. Whatever the reasons behind the sectoral distributions of banking networks and the apparently poor

diversification by the great banks, since the provincial universal banks covered many of the branches of industry not included in the great banks' networks, the universal banking system as a whole enveloped a broad swath of German industry by the beginning of the twentieth century.[23]

The BCI Network

The story is somewhat different in Italy, though certain features remain in line with the German experience. Universal banking of the German variety arrived late in Italy, and by that time, interlocking directorates were becoming commonplace. As soon as they began operations, the two largest of the Italian universal banks, those that were founded largely on the basis of German capital, began to form networks of board membership among industrial firms. Thus, while interlocking directorates clearly provided minimal capital mobilization for the German industrialization, banking networks had the potential to play a significant role in the Italian experience.

BCI clearly out paced all other banks in the creation of interlocking directorates, and therefore this study focuses on this one bank.[24] Because BCI's practices may have been anomalous among its domestic colleagues, it is important to avoid drawing generalizations about the Italian banking system from the following results. Table Vb gives the number and total share capital of all Italian joint-stock companies with at least one million Lire of share capital in 1911 and then compares the number and share capital of firms with affiliation with BCI. The figures are disaggregated by sector.

Table Vb here: *Number and Size of Attached Firms Compared to All Firms, Italy, 1911.*

The firms to which BCI sent representatives were in almost all cases the largest firms in their respective sectors. Overall, 18 percent of firms in the sectors represented in Table Vb received representation from BCI, but attached firms accounted for 40 percent of the share capital in those same sectors. These percentages fall uncannily close to those for Germany (23 percent of all firms and 40 percent of economy-wide share capital), though certain sectors are omitted from the Italian figures that are included for Germany. The excluded sectors--banks, insurance, railroads, and

automobiles--might be expected to receive more than their share of attention from the main Italian universal bank, so the economy-wide percentages for Italy are probably underestimated. Further underestimation may result from the fact that the German figures include board representation by all universal banks, great and otherwise, while the Italian data cover only BCI. Since BCI apparently placed board representatives at a far greater rate than any other bank, however, adding firms attached to other universal banks would likely increase the percentages by a small amount.[25]

The bias towards large firms pervaded the bank's relationships across industries but was more extreme in some sectors than others. BCI maintained representation at one third of the firms in the transport sector, but these companies held over 70 percent of the industry's share capital. In the mining sector, BCI affiliates comprised only 14 percent of firms but 43 percent of the share capital. Equally extreme gaps existed in the chemical and gas, food and beverage, entertainment services (hotels, spas, theaters), and commercial (export) sectors, and more moderate unbalance prevailed among metal, mechanical engineering, electrical, leather, stonewares, glass, construction, and real estate companies. Indeed, only in the rubber and canal industries, do the data show a lack of emphasis on the largest firms, however, this result stems mainly from the small number of firms in those sectors. There were only 3 rubber companies with share capital over one million Lire, and BCI linked itself to the second largest.

Comparing the share of attached firms in each sector with the corresponding percentages in the underlying population reveals that BCI appears to have held a more highly diversified portfolio of firm connections than did the great banks. Indeed, despite the evident bias towards the largest firms, the sectoral distribution for BCI parallels relatively closely that in the underlying population. Like the German great banks, however, BCI did place greater emphasis on transportation and metals and less on food and beverages. BCI, however, was far more involved with textile and chemical firms than were the large, Berlin banks. Textile companies comprised 18 percent of the population of the companies in Table Vb and about the same share of BCI-affiliated firms. Though relative to its context, BCI had attained equivalent stature as the German great banks, the Italian great bank seems to have pursued a different strategy than its forebears in distributing its involvement in the economy. As a result, its network of firm connections appears more similar to the provincial universal banks in Germany than to its Berlin counterparts.[26]

Differences in the structure of industry in Italy and Germany may mean that the characteristics of particular branches vary from country to country. Thus, it may prove fallacious to liken BCI to the provincial German banks to the exclusion of the great banks. Investigation into the financial characteristics of firms affiliated with small and large universal banks suggest several similarities among bank-affiliated companies. Furthermore, even when differences arise between great-bank and provincial-bank affiliates, BCI firms do not match up exactly with either bank category.

The clearest similarity among firms associated with BCI and the companies connected with the great banks is their size. Whether measured by share capital or fixed assets, scale is the most significant correlate of affiliation with the largest universal banks in both countries.[27] Size, however, offers, if anything, negative predictions of provincial-bank attachment. Firms' internal liquidity provides less consistent prediction of bank attachment than does size. Among German firms in the early twentieth century, those with relatively high levels of internal funds (controlling for several other factors) were more likely to be involved in a great-bank network than not. Though statistically weaker, liquidity also is associated with provincial-bank affiliation and therefore fails to discriminate sharply between great-bank and provincial-bank firms.

In Italy, though liquid assets were higher among attached firms than independents during the same period, the stock of liquid assets appears to provide a noisy indicator of bank connections. In a probit regression of several firm characteristics on a binomial attachment variable, the estimated coefficient on liquidity is high but is also associated with high standard error. Only when size controls are excluded does stock liquidity achieve strong statistical significance. Clearly, there are several bank-attached firms with particularly high liquidity relative to their size, but there are also many with levels on par with those of independent firms.[28]

Firms' age offers somewhat more power in distinguishing provincial-bank and great-bank attachment. While older firms are more likely to have become affiliated with provincial banks, they were, if anything, less likely to link up with the great banks. Similarly, age provides negative, but statistically insignificant prediction of BCI affiliation. It is important to note that German joint-stock

companies tended to be significantly older than their Italian counterparts at the beginning of the twentieth century and that these age comparisons are therefore made relative to each country's population of firms.[29]

On the basis of relative age and size of their affiliated firms, BCI lies closer to the great banks than to the provincial banks. In contrast, the importance of internal liquidity for BCI firms appears to compare more closely with the provincial banks' affiliates. Clearly, therefore, the BCI network shares characteristics of those formed by both the provincial German banks and the great banks.

Patterns of Investment

So far, the evidence has indicated little involvement by the German universal banks in the mobilization and utilization of capital through deposit taking or interlocking directorates. Nonetheless, the universal banks may have made such an important impact on the policies and programs of their affiliated firms, that the banks still may be seen as important catalysts for efficient capital utilization and economic growth. The universal banks seem to have played a potentially greater role in the main phases of Italian industrialization, and therefore investigation of bank-attached firms' investment patterns is of particular interest in the Italian context.

The findings on investment are illuminating. On the basis of discrete-choice analysis of bank affiliation in both Germany and Italy, investment in fixed capital is either unassociated with or negatively correlated with bank attachment. This effect emerges even for the small number of bank-affiliated firms in the end of the nineteenth century in Germany. Furthermore, measures of revenue and share capital growth, where available, provide either no or negative predictions of bank attachment. These results suggest that membership in a universal banking network neither caused nor resulted from rapid expansion of the firms' productive capacity or demand. The fastest growing companies remained independent of bank board membership.

Among Italian firms, investment and share capital are much more highly correlated for unattached firms than for attached firms (80 percent versus 49 percent). This may suggest that unattached firms issue new equity in order to invest in fixed capital, while attached firms use other means, but the result finds only weak support in the evidence on debt-equity ratios of Italian firms.

Debt-equity ratios are positively related to attachment Italy, but the relationship is only statistically significant when size controls are excluded. The high standard error on debt-equity ratios indicates that, while many attached firms have markedly higher debt-equity ratios than independent firms, the pattern is insufficiently widespread to provide a good indicator of attachment in general. In Germany, more highly leveraged firms were significantly less likely to be affiliated with any universal bank in the last two decades of the nineteenth century and were no more likely to become attached in the ten years before World War I.

These results contradict the standard notion that universal bank affiliation offered improved oversight of firms' use of outside funds. In theory, close bank involvement lowers a firm's cost of debt relative to equity and, therefore, makes debt financing more advantageous to attached firms relative to unattached firms. If, however, bank attachment is important for *ex ante* monitoring (in the sense of Aoki (1994)), and if the presence of bankers on a firm's board conveys important signals to the capital market, then perhaps the results simply reveal countervailing forces in the financing decisions of attached firms. The cost of both debt and equity may be lowered for bank-attached firms relative to independent firms.[30] Nonetheless, firms with lower costs of capital might be expected to invest at higher rates than similar firms facing higher costs. Yet bank-affiliated firms invested less on average relative to their size. One logical result, then, is the conclusion that firms became affiliated with banks (at least the largest banks) only once they had reached the later stages of growth. These findings in turn imply either that banking networks were not the primary conduit of bank oversight and advice, or that universal banks failed to foster those firms that contributed most to economic growth.

Another means of determining the importance of bank affiliation on the efficiency of capital utilization is to investigate the relative liquidity constraints of attached and independent firms. If, as is often claimed in the literature on universal banking, financial institutions act as monitors, they should acquire more and better information about their clients' investment opportunities and managerial competency than do individual investors. Others have argued that attenuation of asymmetric information problems allows affiliated firms to use relatively low-cost outside funds to invest as soon as investment opportunities arise, rather than waiting until sufficient liquidity can be accumulated. This same asymmetric information problem will cause un-monitored firms--who

cannot defend the viability of each project to individual investors--to time investments according to their liquidity. According to this logic, investment, therefore, should be more sensitive to internal funds for unattached firms' than for attached firms.[31] Furthermore, systems in which banks are particularly adept at monitoring should dominate arms-length systems of finance.

The main approach to measuring the effects of liquidity constraints is to estimate Tobin's Q investment equations with the addition of liquidity variables. If bank relationships indeed create dynamic reductions in financing costs, then the effects of bank relationships will become more pronounced with time. Attached firms' liquidity sensitivity of investment, while perhaps equal to that of independent firms in the short run, should be lowered in the long run. By including additional measures of the length of the bank-firm relationship, the dynamic effect of bank involvement can be tested.

In the period after 1900, when interlocking directorates were common, the findings indicate that attached firms experienced higher liquidity sensitivity of investment than unattached firms, but that sensitivity was reduced for the oldest attached firms. Before 1900, when formalized relationships were unusual, firms with great-bank attachments experienced far lower liquidity sensitivity than independent firms (even in the short run), but no such effect existed for provincial bank affiliates. The earlier period results, however, weaken considerably under closer scrutiny. A small number of great-bank firms maintained extremely high levels of internal funds relative to their size, yet they invested considerably less than unattached firms. Because of the small number of attached firms, these few companies wield undue statistical influence and dampen the estimates of great-bank firms' liquidity sensitivity. When these outliers are omitted, the relationship between liquidity and investment for attached firms falls in line with that of independent firms.

The Italian case suggests similar conclusions, but there are some important differences. The results suggest that bank relationships had little effect on the liquidity constraints of the general population of investing firms, but that they may indeed have attenuated liquidity constraints for very young firms. The results indicate that, among bank-attached firms, only newly-founded joint-stock companies experienced distinct reductions in their liquidity sensitivity of investment.

In both countries, firms with bank attachments were clearly different than independent firms, and these differences may suggest selectivity biases that account for the divergence of liquidity

sensitivity between the two types of firms. Even advanced econometric techniques that attempt to control for such bias, however, fail to undermine the qualitative results presented here.[32] Furthermore, even if the results stem purely from the biases introduced by membership in a bank network, the findings undermine the notion that bank affiliation provided important oversight functions that improved the efficiency of capital utilization during industrialization. Given the somewhat lower liquidity sensitivity for young Italian firms that were investing, however, the evidence suggests that BCI played a more significant role in this regard than did its German counterparts.

Concluding Remarks

This paper has offered evidence on the universal banks' role in capital mobilization and utilization in Germany and Italy during industrialization. Several conclusions arise from the research presented here. The universal banks in Germany mobilized little capital through branching and deposit taking or via networks of interlocking directorates until the latest phases of industrialization. The universal banks developed these practices so late, in fact, that it is difficult to discern the causal relationships involved. Rather than acting as catalyst, the expansion of both deposit-taking and interlocking directorates may well have resulted from the growth and changing structure of the German economy towards the end of the nineteenth century.

Naturally, the tardiness of industrialization in Italy enabled that economy to select certain features from the financial systems of countries that had preceded it. In this case, part of that emulation involved adoption of German-style universal banking. Though the two largest banks began with German backing, they were always under the control of (fundamentally) Italian management and soon adapted to the particularities of the Italian economy.[33] Italian universal banks, relative to the Italian industrialization period, seem to have engaged earlier in both deposit taking and interlocking directorates with industry than did the German banks. While the Italians clearly lagged the Germans chronologically in the formation of industrial networks, the relative latecomers seem to have preceded their sponsors in the mobilization of capital through the deposit business.

In both Germany and Italy, firms belonging to the universal banks' networks seem to have performed quite similarly to those lacking the potential benefits of bank affiliation. Indeed, fast growth of working capital and revenues, if anything, decreased the probability of universal bank affiliation. Furthermore, banks apparently sought out relatively liquid firms for their networks and failed to ease the constraints of most of their less liquid affiliates. The findings undermine the notion that universal banks are particularly well-suited to ameliorate market imperfections that create opportunities for moral hazard problems and cause inefficient industrial investment.

The evidence from both Germany and Italy casts doubt on the generally-accepted view that the specific features of universal banking solved the capital mobilization and utilization problems and thereby promoted the strong economic growth of relative latecomers to industrialization. These findings should not, however, be seen as condemnation of the German and Italian financial systems. Given recent research on the British and American financial systems, it is unclear how significantly the continental banks diverged from their British and American counterparts, and it is difficult to ascertain whether the German and Italian economies could have sustained and benefited from some alternative system of finance and corporate governance.[34]

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1.Cameron (1967), p. 292.

2.See, for example, Eistert (1970), Gerschenkron (1962), Schumpeter (1939). For measured accounts see Cameron (1967) and Tilly (1965, 1991). For contemporary accounts, see Jeidels (1905), Riesser (1910), Sombart (1909). Nine of the universal banks, because of their extreme size, earned the name Great Bank. The great banks were Berliner Handelsgesellschaft, Commerz- und Discontobank, Darmstädter Bank, Deutsche Bank, Discontogesellschaft, Dresdner Bank, Mitteldeutsche Creditbank, Nationalbank für Deutschland, and A. Schaaffhausen'scher Bankverein.

3.See Federico and Toniolo (1992) for a discussion of indices of industrial production. See also Cohen (1977) for a survey of major industrial sectors.

4.Gerschenkron (1955), p. 374. See also Cohen (1977), p. 85.

5. See Zamagni (1994), Goldsmith (1969).

6.See Ross Levine (1996).

7.Brockhage (1910), p. 182, as cited in Whale (1930), p.11.

8.Whale (1930), p. 11.

9.See Motschmann (1915) for an exhaustive survey of the deposit business of the Berlin banks.

10.This point is made in Fohlin (1994) as well as in Edwards and Ogilvie (1996).

11.The southern provinces include Bavaria, Württemberg, Baden and the Palatinate, Hessen, and Alsace-Lorraine. Lacking population data at this time, it is impossible to compare the more important measure of branches per capita.

12.For international comparisons of banks' financial structure, see Fohlin (1997, forthcoming).

13.Data for the sample of long-lived firms were compiled by Rudi Rettig and were provided by Richard Tilly. See Rettig (1978) and Fohlin (1996a, b) for further details on these data.

14.German joint-stock corporations are governed by two separate bodies: the supervisory board (*Aufsichtsrat*) comprises shareholder representatives, while the executive board (*Vorstand*) includes the top-level managers of the firm.

15.There is also the question of geographic concentration of bank involvement. While this issue is not addressed in this paper, I am currently compiling data on the regional distribution of banking networks.

16.See the quotations of Jeidels (1905) and Gerschenkron (1962) in Fohlin (1996c).

17.Edwards and Ogilvie (1996) estimate the share of joint-stock companies in the capital stock of Germany. Their numbers are based on Hoffman (1960).

18.*Deutscher Ökonomist* as cited in Riesser (1910).

19.Fohlin (1996c). That paper also gives an in-depth discussion of the ways in which banks and firms may have formed interlocking directorates, characteristics associated with bank-affiliated firms, trends in the formation of bank networks, and alternative hypotheses about why formalized relationships arose in Germany at the end of the nineteenth century.

20.See Edwards and Ogilvie (1996) on the lack importance of universal banks, Wellhöner (1989) on the exaggerated claims of importance made by Hilferding (1910), as well as Eistert (1970) and Neuberger and Stokes (1974) on the macroeconomic effects of bank policies. See also Herrigel (1996) who criticizes the unitary approach to studying German economic history as well as Pollard (19xx) on regional variation. Tilly (1965) offers a balanced view.

21.The data come from *Handbuch der deutschen Aktiengesellschaften* (1905). See Fohlin (1996b) for further discussion of the sources, sampling methods, determination of bank affiliations, and firm characteristics.

22.The data in Sombart (1913) exclude transport and construction firms, so the share of these firms in the population are missing. Share capital for these sectors is estimated from Wagon (1903). I have excluded commercial and financial services companies from the calculation.

23.As Edwards and Ogilvie (1996), the universal banks could only pursue interlocking directorates with joint-stock companies, and such firms comprised a modest share of Germany's productive capital. Further research is required, however, to determine the extent to which the universal banks developed relationships with private companies.

24.See Cohen (1961) and *Notizie Statistiche* (1912) for comparisons of interlocking directorates formed by the two banks.

25.It would be possible to use the reports in *Notizie Statistiche* (1912) to determine which bank executives sat on the boards of other companies. The results would not compare exactly to the measures used here for BCI, because not all bank representatives held positions in the executive board. The data on BCI representation were gathered with major help by Francesca Pino-Pongolini, director of the BCI archive, to whom I am very grateful. To the extent that German banks sent representatives to firms and did not simultaneously seat these individuals on the banks' executive boards, the comparisons between Italy and Germany become more complicated.

26.Though industrial structure in Italy differed from that in Germany, the point is the distribution of affiliations relative to the underlying population.

27.Fohlin (1996a, b).

28.Part of the difference in the German and Italian results may stem from the sampling procedure. Whereas the German firms were selected first and categorized second, the Italian firms were chosen for their affiliations with BCI and a control group of the most similarly sized firms was sampled subsequently. Since BCI was affiliated with the largest firms in most sectors, this means that size is an obvious predictor of attachment. It is difficult, therefore, to distinguish size effects from bank effects.

29.The average age of German joint-stock companies in 1905 was between 17 and 20 years (depending on bank affiliation). In Italy, the mean was around ten years. It may make more sense to compare German firms in the end of the nineteenth century with Italian companies of the early twentieth century. Since the German banks apparently formed few interlocking directorates during the earlier period, however, it is difficult to make strong statistical claims about attached firms' characteristics. Even in the early period, German joint-stock firms were apparently somewhat older than their Italian counterparts of the later period. See Fohlin (1994, 1996a, 1996d).

30.In Italy, bonds issued by attached and independent firms paid approximately the same rate in the early years of the twentieth century. These numbers naturally only capture firms that chose to (or were able to) issue bonds, and as such they may suffer from selection bias. Indeed, BCI affiliated firms used bonds far more than their unattached counterparts. Bond rates are, unfortunately, unavailable for the German firms in this study.

31.See Fohlin (1996a, b) for further discussion of this approach and comparisons with other empirical studies.

32.Fohlin (1996b) goes to extremes to account for potential selection biases.

33.It is often emphasized that BCI was first managed by two Germans. While the first managers of BCI were both born in Germany, they had lived in Italy most of their lives and had spent their careers in Italian banks: Otto Joel at the Banca Generale and Federico Weil at the Credito Mobiliare.

34.See Collins (1991) for a comprehensive review of the British financial system between 1800 and 1939. Also see Michie (1988) comparing the British capital market to those on the continent (notably Germany).

Table I
Deposit offices of Berlin banks

Deposit Offices		*Deposit Offices in 1913*	
Year	Number	Bank	Number
1885	10	Deutsche Bank	48
1894	22	Dresdner Bank	47
1901	73	Commerz- u. Discontobank	44
1905	124	Darmstädter (BHI) Bank	30
1913	252	Discontogesellschaft	26
		Nationalbank f. Deutschland	21
		Schaaffhausen'scher Bankverein	20
		Mitteldeutsche Creditbank	16
		Berliner Handelsgesellschaft	0

Source: Compiled from Motschmann (1915), pp 54-9.

Table II

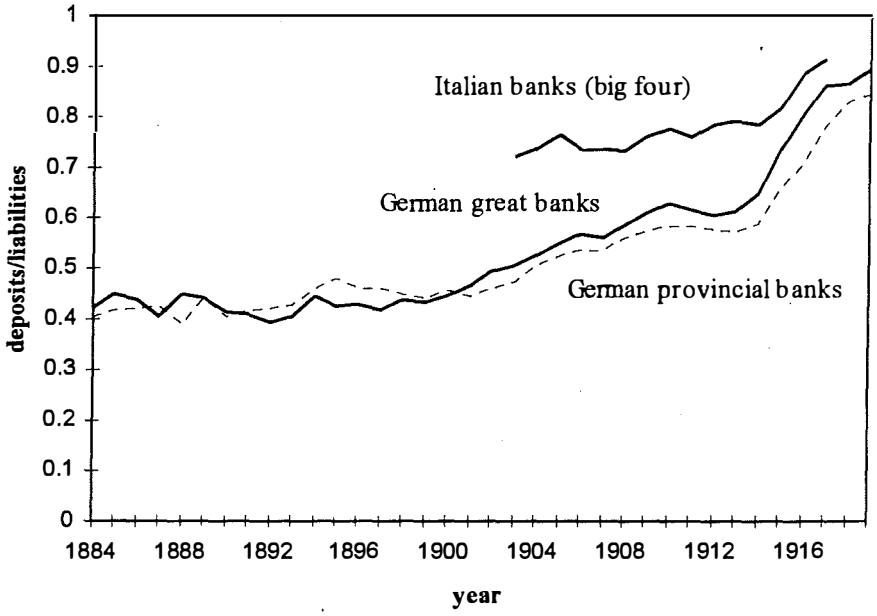
Deposits Held at German and Italian Universal Banks

Year	German Great Banks:			German Provincial Banks:			Italian Universal Banks:		
	Number	Levels (millions)	Share of Liabilities	Number	Levels (millions)	Share of Liabilities	Number	Levels (millions)	Share of Liabilities
1885	7	478	0.45	71	484	0.42			
1890	7	567	0.41	92	719	0.40			
1895	8	902	0.42	94	867	0.48			
1900	9	1,455	0.44	118	1,673	0.46			
1903	9	2,015	0.51	124	1,695	0.47	4	466	0.72
1905	9	3,042	0.55	137	2,256	0.53	4	842	0.76
1910	9	4,882	0.63	165	4,241	0.58	4	1,361	0.78
1915	8	6,856	0.73	148	4,913	0.66	4	2,103	0.82
1917	8	15,210	0.86	127	7,971	0.78	4	5,566	0.91
1918	8	19,696	0.87	120	10,285	0.83			
1919	8	39,141	0.89	115	15,460	0.84			
1920	8	62,566		105	21,960				

Notes: Deposits are calculated as the sum of deposits and current account credits. Levels are given in Marks for German banks and Lire for Italian banks.

Sources: German data are calculated from Deutsche Bundesbank (1976), and Italian data are calculated from Credito Italiano (1912, 1918).

Figure 1
Deposits as a Share of Bank Liabilities (1884-1919)



Notes: Deposits includes credits on current account.
Sources: Deutsche Bundesbank (1976) and Credito Italiano (1912, 1918).

Table III
Liquidity and Profitability of German and Italian Firms, 1880-1912

Year	Median Stock Liqudity/Fixed Assets:			Median Net Profits/Fixed Assets:		
	Long-Lived German Firms	German IPO Firms	Italian Firms	Long-Lived German Firms	German IPO Firms	Italian Firms
1880	0.19			0.06	0.05	
1882	0.24	0.05		0.09	-0.01	
1884	0.31	0.05		0.09	0.03	
1886	0.30	0.09		0.03	0.01	
1888	0.33	0.06		0.01	0.02	
1890	0.39	0.11		0.02	0.03	
1892	0.32	0.10		0.03	0.03	
1894	0.35	0.15		0.03	0.06	
1896	0.38	0.20		0.06	0.08	
1898	0.45	0.29		0.08	0.11	
1900	0.50	0.36		0.11	0.05	
1902	0.34	0.30		0.05	0.07	0.06
1904	0.35	0.38	0.40	0.07	0.08	0.08
1906	0.40	0.52	0.46	0.08	0.09	0.06
1908	0.39	0.62	0.38	0.09	0.06	0.06
1910	0.49	0.50	0.37	0.06		
1912	0.60					
Growth rate	0.02**	0.08**	-0.02	0.01*	0.06*	-0.01
	0.00	*0.01*	*0.01*	*0.00*	*0.01*	*0.02*
Adjusted R^2	0.63	0.87	0.06	0.13	0.47	-0.11
F-statistic	56.59**	184.06**	1.48	5.85*	24.54*	0.23

Notes: Growth rates are estimated as the coefficient in an OLS regression of the log of median liquidity or profits on a constant and a time trend. Standard errors are in italics below coefficient estimates. (**, *) indicate statistical significance at better than one percent and five percent, respectively.

Sources: Saling's Börsen-Jahrbuch (various years) and Credito Italiano (1912).

Table IV
Firm Board Variables by Bank-Attachment Category

Variable	Attachment with:with:					Oneway	P-Value of T-test:Ttest:			
	No banks	Private banks	Small banks	Great banks	Mixed	ANOVA	NOB v. Banks	NOB v. PB	GB v. SMGB	SMB v. GB
Number of *Vorstand* members	1.77 *1.27*	1.53 *0.77*	2.07 *1.62*	1.44 *0.88*	3.07 *4.31*	0.00	0.01	0.24	0.01	0.08
Number of *Aufsichstrat* members	4.86 *2.22*	5.32 *1.70*	6.12 *3.14*	5.22 *1.48*	7.99 *4.51*	0.00	0.00	0.29	0.00	0.14
Number of private banks attached	0.00 *0.00*	1.05 *0.23*	0.39 *0.73*	0.22 *0.44*	1.00 *1.08*	0.00	n/a	n/a	0.00	0.33
Number of small banks attached	0.00 *0.00*	0.00 *0.00*	2.30 *3.20*	0.00 *0.00*	6.07 *5.46*	0.00	n/a	n/a	n/a	n/a
Number of Great banks attached	0.00 *0.00*	0.00 *0.00*	0.00 *0.00*	1.56 *1.13*	2.70 *2.49*	0.00	n/a	n/a	0.03	n/a
Percentage of *Vorstand* attached	0.00 *0.00*	0.00 *0.00*	7.77 *22.39*	0.00 *0.00*	3.98 *15.56*	0.00	n/a	n/a	n/a	n/a
Percentage of *Aufsichistat* attached	0.00 *0.00*	23.14 *11.01*	30.17 *18.47*	26.20 *16.35*	53.25 *24.00*	0.00	n/a	n/a	0.00	0.51
Number of non-bank firms attached	1.28 *3.89*	6.79 *7.18*	11.91 *18.93*	8.00 *9.50*	37.87 *39.13*	0.00	0.00	0.00	0.00	0.30
Listed on a German stock exchange	0.16 *0.37*	0.42 *0.50*	0.57 *0.50*	0.78 *0.44*	0.63 *0.49*	0.00	0.00	0.04	0.40	-
Listed on Berlin stock exchange	0.05 *0.21*	0.37 *0.50*	0.32 *0.47*	0.33 *0.50*	0.43 *0.50*	0.00	0.00	0.01	0.58	0.96
Bank director on firm S.B.	0.00 *0.00*	0.00 *0.00*	0.43 *0.50*	0.44 *0.53*	0.60 *0.49*	0.00	n/a	n/a	0.42	0.92
Firm director on bank S.B.	0.00 *0.00*	0.00 *0.00*	0.09 *0.29*	0.00 *0.00*	0.09 *0.28*	0.00	n/a	n/a	n/a	n/a
Same person on bank and firm E.B.	0.00 *0.00*	0.00 *0.00*	0.05 *0.21*	0.00 *0.00*	0.04 *0.20*	0.04	n/a	n/a	n/a	n/a
Same person on bank and frim S.B.	0.00 0.00	0.00 0.00	0.71 0.45	0.78 0.44	0.97 0.17	0.00	n/a	n/.a	0.23	0.68
Bank director on firm S.B. only	0.00 *0.00*	0.00 *0.00*	0.23 *0.42*	0.22 *0.44*	0.03 *0.17*	0.00	n/a	n/a	0.23	0.95
Chair of S.B. attached	0.00 *0.00*	0.32 *0.48*	0.47 *0.50*	0.44 *0.53*	0.57 *0.50*	0.00	n/a	n/a	0.51	0.88
Vice-chair of S.B. attached	0.00 *0.00*	0.11 *0.32*	0.19 *0.39*	0.22 *0.44*	0.47 *0.50*	0.00	n/a	n/a	0.15	0.81
Regular member of S.B. attached	0.00 *0.00*	0.68 *0.48*	0.69 *0.47*	0.44 *0.53*	0.94 *0.23*	0.00	n/a	n/a	0.02	0.22
Executive board member attached	0.00 *0.00*	0.00 *0.00*	0.12 *0.33*	0.00 *0.00*	0.10 *0.30*	0.00	n/a	n/a	n/a	n/a

Notes: The five categories of bank attachment are mutually exclusive and exhaustive. "Mixed" refers to affiliation with a combination of great banks and small or private banks. NOB, PB, SMB, GB, and SMGB refer to firms with attachments to no banks, private banks only, small banks only, great banksonly, and a combination of banks, respectively. S.B. and E.B. refer to supervisory board and executive board, respectively. The oneway ANOVA tests for differences in means among the five attachment categories, while theT-test tests for differences of means between the two given categories. Standard errors are in italics.

Source: *Handbuch der deutschen Aktiengesellschaften.*

Table Va

Share Capital and German Great-bank Representation by Industry, 1910

Sector	Share of firms	Average share capital	Share of bank reps.[a]	Industry K/ average K
Transport[b]	***	10.9	0.15	4.7
Iron & steel	.04	9.1	0.24[c]	3.9
Electrotechnical	.05	6.1	0.24[d]	2.6
Coal & coke	.03	5.8	---	2.5
Salt & potash	.01	5.4	---	2.3
Construction[b]	***	3.3	0.02	1.4
Chemical	.05	2.5	0.05	1.1
Textiles	.10	2.0	0.04	0.9
Machine-heavy	.12	1.8	---	0.8
Metal	.05	1.7	0.06	0.7
Paper	.03	1.7	0.01	0.7
Rubber	.01	1.7	0.004	0.7
Ice & water	.01	1.7	***	0.7
Oil, gas, & petrol.	.06	1.6	***	0.7
Leather	.01	1.6	***	0.7
Food & drink	.27	1.4	0.06	0.6
Stones & earth	.09	1.3	0.04	0.6
Machine-light	.02	1.2	---	0.5
Wood	.02	1.2	0.002	0.5
Printing	.04	0.6	0.01	0.3

[a] Excluding trade and foreign firms.

[b] Average capital based on 1900 data.

[c] Includes coal & coke and salt & potash.

[d] Includes machine.

Notes: Share of firms indicates the number of the given sectors' firms as a share of all firms. Share capital is given in millions of Marks. Share of bank reps. indicates the number of great banks' representatives to the given sector as a share of all great bank representatives to joint-stock firms.

Source: Calculated from Sombart (1913), p. 488, 501-4. Transport and Construction are calculated from Wagon (1903), statistical appendix.

Table Vb
Sectoral Distribution of the BCI Network, 1911

Sector	All Firms:		Firms with BCI affiliation:			
	Number	Total Share K	Number	Share of all firms	Total Share K	Share of all capital
Banks	33	460,365	BCI	--	130,000	0.28
Transportation	39	240,080	13	0.33	169,400	0.71
Textiles	113	434,098	21	0.19	124,100	0.29
Mining	29	132,449	4	0.14	57,400	0.43
Metal	30	195,838	11	0.37	120,700	0.62
Mech. engineering	52	191,960	12	0.23	93,000	0.48
Electrical	71	384,703	17	0.24	143,062	0.37
Paper	16	32,213	2	0.13	9,375	0.29
Leather	8	15,150	2	0.25	9,000	0.59
Chemicals/gas	66	235,987	9	0.14	89,350	0.38
Food/beverage	74	237,890	6	0.08	49,200	0.21
Rubber	3	19,000	1	0.33	3,000	0.16
Ceramics/pottery	5	17,100	1	0.20	10,000	0.58
Crystal/glass	7	18,150	1	0.14	6,000	0.33
Construction	11	34,599	2	0.18	16,000	0.46
Real estate	32	204,085	6	0.19	80,198	0.39
Canals/aqueducts	9	65,200	1	0.11	10,000	0.15
Hotels/spas/theaters	21	39,770	1	0.05	9,000	0.23
Commercial/exports	15	42,250	1	0.07	12,000	0.28
Total of above sectors	601	2,540,522	112	0.18	1,140,785	0.40
Total reported in N.S.	793	3,898,174	--	--	--	--

Notes: Share capital figures are given in thousands of Lire. Banks, insurance, railroads, and automobiles are excluded from the sectoral breakdown but are included in the totals reported in the bottom row of the table. Chemical sector includes electro-chemicals. Share capital data for one chemical firm and one canal firm are missing. The source reports only on firms with at least L. 1,000,000 Share Capital.
Source: Calculated from *Notizie Statistiche*, 1912.